Solar Energy

ITA expects the solar sector to install more capacity through 2016 worldwide, and account for more U.S. exports than any other renewable energy technology. The industry's economics continue to improve, although trade disputes have shifted investment patterns and threaten to limit access to key export markets. Unfortunately, the United States' share of the global import market continues to be severely hampered by a lack of domestic manufacturing capacity.

Since 2008, the solar industry has grown rapidly as a source of energy and economic activity, both in the United States and around the world. The sector's growing cost competitiveness and continued technological improvements should continue to support growth well into the future.

The industry, which is decidedly global, involves a wide range of companies, each with different needs, opportunities, and challenges. Companies are often headquartered in one country but operate worldwide, shipping products easily across borders. Large manufacturers typically have supply chains in several countries at once, importing components from many different suppliers at once.

U.S. Solar Industry Export Base

Of the solar manufacturing firms operating in the United States, more than 90 percent of their capacity resides outside the U.S. market.[78] As a result, the United States maintains only a small share of global manufacturing capacity in the sector – roughly five percent, despite inventing or innovating most solar technologies deployed globally over the last three decades. Unless losses in manufacturing capacity are reversed, this lack of market share will decline further.

While the price of solar technologies should continue to fall due to efficiency improvements and increasing economies of scale, the oversupply of cells and modules that defined the industry in 2011-2013 has waned. Prices have begun to stabilize, although expanded polysilicon production could reduce prices on downstream products, like cells and modules, towards the end of 2015 and beyond.[79] Advances in molten salt energy storage technologies, dry-cooling systems, and improved manufacturing processes should also support further prices declines vis-à-vis other renewables and fossil fuel alternatives going forward.[80]

The volatility caused by falling prices has resulted in many closures, mergers, and acquisitions – both in the United States and around the world. The industry's consolidation, as well as improvements in processes, has left the remaining solar manufacturers more financially secure. Competition for investors, projects, and market share, however, remains fierce.

Overview of Global Export Market Opportunities

Based on forecasts from Bloomberg New Energy Finance and Business Monitor International, ITA projects the solar industry will install roughly 76 GW of new capacity outside the United States in 2015-2016 – more than any other clean energy technology. The industry should continue its significant development into the medium-term, installing nearly 140 GW of new capacity outside the United States through 2020.

Over the next two years, however, foreign suppliers will

Figure 1: Near-Term Solar Export Markets (2015-2016)

1. **Japan**
   (large market; small share)
2. **India**
   (large market; large share)
3. **Saudi Arabia**
   (large market; small share)
4. **Chile**
   (large market; large share)
5. **Canada**
   (small market; large share)
6. **Germany**
   (large market; small share)
7. **China**
   (large market; small share)
8. **Ecuador**
   (small market; large share)
9. **France**
   (large market; small share)
10. **Denmark**
    (large market; small share)

meet much of this growth, as the United States is expected to capture just 5.2 percent of the global solar import market. The small U.S. market share is limited by a general lack of domestic manufacturing capacity and the United States' status as a net importer of solar technologies. However recent announcements of U.S. manufacturing capacity expansion from at least seven solar manufacturers may increase this number.

The Solar Energy Export Opportunity in the Near-Term

Through 2016, ITA expects Japan to account for over one-third of all U.S. exports in the sector – more than any other country. Despite installing about 10 GW less solar capacity than China, U.S. exporters are expected to be far more competitive in Japan.

While much smaller markets, U.S. exporters enjoy considerably more market share in the Western Hemisphere. Five markets in the hemisphere rank in the top 20 projected export markets, including Chile (4th) Canada (5th), Ecuador (8th), Mexico (11th), and El Salvador (16th).

China is expected to install the most solar power through both 2016 and 2020, but U.S. exporters will capture only a small share of the Chinese import.

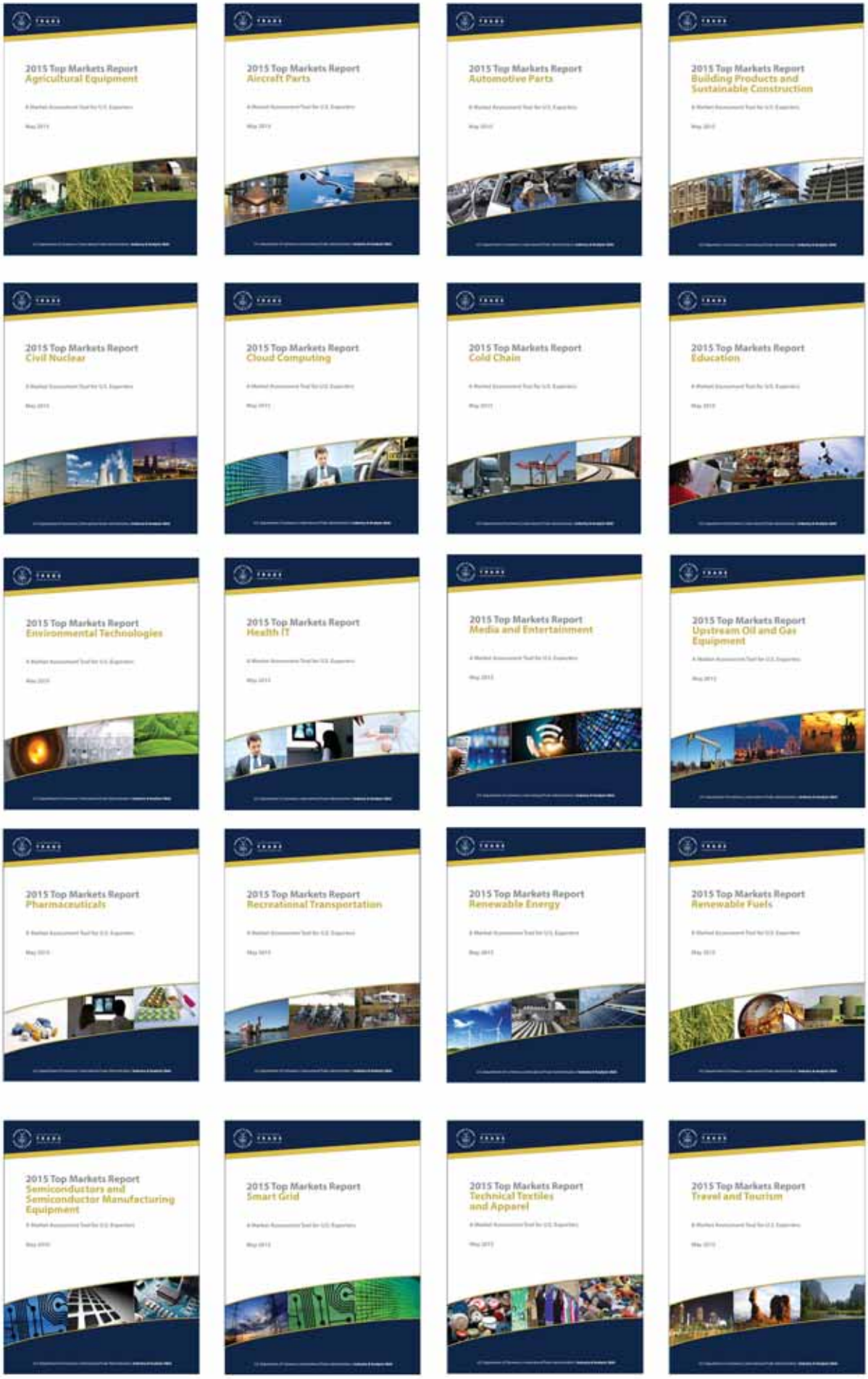
One important opportunity in the near-term will likely be the export of services, particularly financial and other consultancy services that have changed the way solar power is delivered to customers in the United States. Solar leasing, crowd sourcing, and the use of on-bill repayment, for example, should all improve the attractiveness of distributed PV for customers, with U.S. companies providing the know-how and expertise to finance these projects around the world.

Planning for the Long-Term

ITA expects the solar industry to nearly double its installed non-U.S. capacity by 2020, installing over 140 GW of new capacity by the end of the decade. China is projected to have the largest solar capacity by the end of the decade, followed distantly by Japan, Germany, India, and Saudi Arabia. In most markets, U.S. suppliers will find steep competition from lower-cost manufacturers.

The types of solar technologies deployed in these markets will also change by 2020 with a greater emphasis placed on distributed PV systems. High electricity prices in most countries and decreasing production costs will converge to make distributed PV systems more economical. While policy barriers, like net-metering restrictions, could hamper growth, demand for roof-mounted PV should be too great for policy-makers to prevent widespread investment, potentially provoking changes to transmission and distribution models.

Importantly, as the solar industry approaches and eventually surpasses grid parity, long-term performance and efficiency should become key differentiating factors between module manufacturers. If the United States can maintain, or even expand, its share of the global solar manufacturing, this dynamic should portend increased in U.S. export competitiveness.



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